Range extension of the Short-beaked Echidna *Tachyglossus aculeatus* (Monotremata: Tachyglossidae) and the Northern Brown Bandicoot *Isoodon macrourus* (Marsupialia: Peramelidae) in Queensland: Mua (Moa Island), Torres Strait

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ABSTRACT

Until recently there have been no confirmed records of medium-sized native terrestrial mammals from the Torres Strait Islands, far north Queensland. The Short-beaked Echidna (*Tachyglossus aculeatus* Shaw, 1792) and the Northern Brown Bandicoot (*Isoodon macrourus* Gould, 1842) are reported here occurring on Mua (Moa Island). This is the most northerly known occurrence of these species in Australia; both also occur in New Guinea. ❐ *Echidna, Bandicoot, Torres Strait Islands, refugial fauna, translocation, dispersal.*

The mammal assemblage of Torres Strait is not well documented, with little research having been undertaken (Cameron *et al.* 1978:193; Ingram 2008:619; Lavery *et al.* 2012:180; McNiven & Hitchcock 2004:107; Strahan 1995:444). The largest native terrestrial mammals known to occur on the islands are the introduced Dingo (*Canis lupus dingo*), which was once widespread in the region (McNiven & Hitchcock 2004:120-122), and unidentified wallabies on Albany Island (Warham 1962:102) and Agile Wallabies (*Macropus agilis*) on Friday Island (Cameron *et al.* 1978:193) in southwest Torres Strait, close to Cape York Peninsula. There are no confirmed records of medium-sized mammals in the literature, although

the presence of echidnas and bandicoots on several islands has been reported previously by Torres Strait Islanders and others: echidnas on Mua (Moa Island) (Brooke Nicholls 1919:24; Brooke Nicholls & Dunbabin 1920; McNiven & Hitchcock 2004:107,109) and Horn Island (McNiven & Hitchcock 2004:109); and bandicoots on Mua (Bosun 2008:17; Manas 2001:5, 2007:19; Tennant 1959:154), Badu Island (Garnett & Jackes 1983:40) and Torres Strait (island not specified) (Leonard *et al.* 1995:592). Our report on a specimen of *Tachyglossus aculeatus* from Mua in the Australian Museum, Sydney (AMS), and collection of two specimens of *Isoodon macrourus* on Mua, in 2011 and 2013, confirms their occurrence in Torres Strait.

MUA

Mua (also known as Moa Island) (10°11'S, 142°16'E) is located approximately midway between Australia and New Guinea and is the second-largest island in Torres Strait. It is a rocky, lightly vegetated continental island of about 17 km diameter, with an area of around 172 km^2. Mua features low-lying sandy plains bordered by granite hills and ridges on its eastern side. The vegetation and flora are the most diverse in the Torres Strait region with 22 broad vegetation groups and some 700 native species known. Major vegetation groups are *Eucalypt*- and *Corymbia*-dominant open forests and woodlands, *Welchiodendron*-dominant closed to open forests and woodlands, *Melaleuca*-dominant shrublands and woodlands, evergreen and semi-deciduous vine forests and thickets, grasslands and mangroves. It is also home to the largest freshwater creek among the islands of the region, Koey Kussa ('Big Creek') (3D Environmental 2013; Stanton *et al.* 2008; Wannan 2008). There are two Torres Strait Islander communities on the island: Kubin and St Pauls, which had populations of 163 and 258 respectively as at the 2011 census (Australian Bureau of Statistics 2012). The majority of the Mualgal, the traditional owners of the island, reside at the former settlement.

METHODS, COLLECTIONS & IDENTIFICATION

A visit to Mua was made between 20-25 March 2011 to assist in the development of a plan for managing the biodiversity and cultural values on the island for the Torres Strait Regional Authority (TSRA) (3D Environmental 2013). As part of this research, an inventory was made of the known terrestrial vertebrate fauna of the island. This involved review of previous literature and museum records, discussions with local community members, and limited field investigations (observation, including spotlighting) in collaboration with the Mua Lagalgau Rangers (a team of local Indigenous Rangers, part of the TSRA's Land and Sea Ranger Program).

Echidna. A review of museum specimens in Australia identified a preserved specimen (flat skin) of a juvenile *Tachyglossus aculeatus* from Mua in the Australian Museum Mammalogy Collection (registration number M.4594), which was presented by Albert Sherbourne Le Soeuf, then Curator of the Taronga Zoological Park and registered into the collection on 28 June 1929. There is no other information associated with the specimen (Patricia Egan & Sandy Ingleby pers. comm. 2012). Le Soeuf also presented two specimens of Water Rat (*Hydromys chrysogaster*) from Mua (M.4558-9) to the AMS in April of that year (Troughton 1935:255).

Bandicoots. A partial male specimen was collected on 22 March 2011 by the survey team on the road between Kubin and St Pauls, at 10°12'26.1"S, 142°16'36.1"E (WGS84 datum). It had most likely been killed by a vehicle. The vegetation in this locality is low woodland dominated by *Melaleuca* and *Asteromyrtus* with a groundcover of sedges. Both the upper and lower jaws were located, but only cranial fragments remained. The pelvis, tail and some fur and tissue were also collected. This material was forwarded to the Queensland Museum (QM) (registration number QM JM19620).

A second, complete male specimen was subsequently obtained by TSRA staff on 18 July 2013 (Fig. 1). This animal was also

roadkill. It was collected within hours of death, frozen and subsequently transferred to the QM (registration number QM JM20021). The collection location was 10°10'55.7"S, 142°18'26.5"E, which is 3 km west of the St Pauls community.

The Mua specimens were examined by one of us (GG) and compared with a sample of up to 25 specimens of Southern Brown Bandicoot (*Isoodon obesulus peninsulae*) and 91 *I. macrourus* from north Queensland. The full range of measurements was not available on all specimens. Both specimens were identified as *I. macrourus* based on the length of the upper molar row, which exceeded 13.75 mm in length, a diagnostic criterion for *I. macrourus* in Queensland (Van Dyck *et al.* 2013:297-298). Both specimens had a molar row > 15.5 mm in length. The molar row of *I. o. peninsulae* and *I. auratus* is less than 13.75 mm.

Other observations of bandicoots. In addition to the roadkill specimens, five adults and two juveniles were also observed over the course of three nights of spotlighting (22-24 March 2011) in the community of St Pauls and along the road between St Pauls and Kubin. Based on location it is likely that all observations were of different individuals. One of the juveniles was being consumed by a cat on the St Pauls-Kubin road. One adult animal was observed in St Pauls in close proximity to houses. This limited field investigation suggests that the species is common on the island.

DISCUSSION

The AMS and QM specimens represent the most northerly known occurrence of *Tachyglossus aculeatus* and *Isoodon macrourus* in Australia. The species occur on the adjoining mainlands: *T. aculeatus* is widespread in Australia, including continental islands, and is also found in southern, southeast and northeast New Guinea, while *I. macrourus* is found in north and eastern Australia, including Cape York Peninsula, and southern and southeast New Guinea (Augee 2008; Flannery 1995a; Gordon 2008). *Isoodon* are not known from any of the other islands off the New Guinea coast (Flannery 1995b), and this is also the case with *Tachyglossus*, save an unconfirmed record from Salawati, eastern Indonesia, a Magnesian land-bridge island connected to New Guinea during the Pleistocene (Flannery 1995b:54; Menzies 2011:21). Both species are abundant in the Trans-Fly region of New Guinea immediately adjacent to the Torres Strait Islands (Hitchcock pers. obs.; Waithman 1979). Torres Strait was formed by rising sea levels in the early Holocene that inundated the Arafura Plain, the low-lying land bridge connecting Australia and New Guinea, with final separation of the mainlands

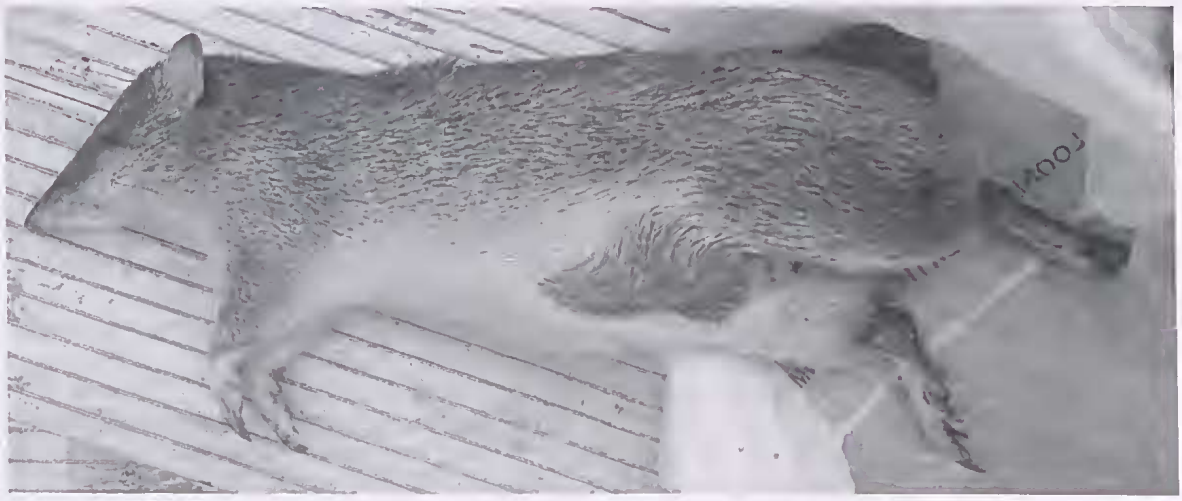

FIG. 1. *Isoodon macrourus* collected on Mua on 18 July 2013 (photo: Mark Ingram).

occurring 9000-8000 years ago (Barham 1999; Jennings 1972; McNiven 2011; Woodroffe *et al.* 2000). The echidna and bandicoot populations on Mua are most likely refugial ones, although it is also possible that they were translocated there by Torres Strait Islanders or Papuans in the past (Ingram 2008:620-621; see also Flannery 1995a:68-69; Heinsohn & Hope 2006:89; McNiven 2008:454-455; McNiven & Hitchcock 2004:117-121). To date, echidna or bandicoot remains have not been recovered from any archaeological excavations in the region (McNiven & Hitchcock 2004:109; McNiven pers. comm. 2013).

Tachyglossus aculeatus has been previously reported on Mua by local people, who state that they are still found on the island, though in small numbers, and were formerly hunted for food (Lillian Bosun pers. comm. 2011; McNiven & Hitchcock 2004:107, 109). Most recently, one of the Mualgal Rangers has reported encountering a dead animal on the edge of closed forest, on the outskirts of the St Pauls community (Guyai Uiduldam pers. comm. 2012). In the local Kala Lagaw Ya language (also known as Western-Central Torres Strait Language), the word for echidna is 'Kuyk' (which can also mean 'head', 'lump', 'knob' or 'base of a tree trunk'), although it is most commonly referred to as 'porcupine'. In November 1919, naturalist E. Brooke Nicholls and ornithologist W.R. McLennan visited the island (see Campbell 1920). On 9 November, Brooke Nicholls noted that 'the only mammals we have heard of are a large rat and the echidna' (Brooke Nicholls 1919:24; Brooke Nicholls & Dunbabin 1920). There is no mention of them encountering either animal. The presence of echidnas has also been reported on Horn Island, although no confirmed records yet exist (McNiven & Hitchcock 2004:109). Dogs, cats and pigs – all of which are present on Mua – are known to predate on echidnas, particularly burrow young (Augee *et al.* 2006:120; Griffiths 1989:429).

In Kala Lagaw Ya the word for bandicoot is 'Makas', which is also the generic name for rodents, however it is more commonly referred to by its English name. It is possible that when local people mentioned or described a 'large rat' to Brooke Nicholls (1919:24; Brooke Nicholls & Dunbabin 1920), they were referring to the bandicoot. While they were hunted in the past at Kubin and St Pauls for consumption, using fire and/or dogs (Bosun 2008:17; Manas 2001:5, 2007:19; McNiven & Hitchcock 2004:109,143; Tennant 1959:154), local people state that this has not occurred for several decades. The biggest threat to the Northern Brown Bandicoot on Mua at present is almost certainly predation by domestic and feral dogs and cats.

Bandicoots are also said to occur on neighbouring Badu Island (10°7'S, 142°9'E) (Garnett & Jackes 1983:40; McNiven & Hitchcock 2004:134). Badu is around 11 km in diameter with an area of 100 km^2, and is separated from Mua by a shallow, narrow (<3 km wide) channel. Garnett and Jackes (1983:54) state that 'within living memory the bandicoot, *Perameles nasuta*, has been introduced'. The basis for this identification and putative origin of the species is not clear.

It is interesting to note that a 1936 newspaper article (Lux 1936:2) suggested a recent origin (or re-establishment) of bandicoots in Torres Strait:

> A hitherto unknown pest in the guise of the bandicoot has made a mysterious appearance in the Torres Strait Islands. How it made the 40-mile journey over water constitutes the mystery, but his presence is established by the resultant havoc amongst the native yam, taro and mainioca [*sic*] gardens. The menace is very real, as the islanders, due to their repugnance for anything furred as a diet—as opposed to his mainland brethren—has no inducement to hunt the pest as food, and thus keep down its numbers.

Several years earlier, the Anglican missionary at St Pauls, Mua, noted that 'the gardens have not been so successful, owing to an invasion of bandicoots' (Home Secretary's Department, 1932:13). Of course, the possibility exists that this writer either misinterpreted a population increase of the species as an introduction, or was simply wrong, perhaps only noting bandicoots after the commencement of mission gardening

efforts in the mid-1920s (see Schomberg 1996: 26, 79).

Nonetheless, consideration must be given to Torres Strait Islanders, or other people, being responsible for the introduction of the species to Torres Strait. The Rev. J.W. Schomberg is known to have imported a single Emu (*Dromaius novaehollandiae*) and three Common Brushtail Possums (*Trichosurus vulpecula*) to Mua in the 1920s (Schomberg n.d.:219-220; Schomberg 1996: 41). The possibility that bandicoots reached the islands by chance dispersal, by rafting, must also be considered. Large logs commonly wash ashore on the Torres Strait islands from New Guinea rivers, including the Fly River, during the annual wet season. In 1981, Pernetta and Hyndman (1982:108) collected a live specimen of *I. macrourus* from a tree floating down the middle Fly.

English anthropologist Alfred Cort Haddon considered that there was no true terrestrial hunting in Torres Strait, on account of the deficient mammal fauna of the islands, which he thought to be restricted to dogs, rats, mice and bats (Haddon 1912a:137, 1912b:152, 1912c:230; 1912d:358). It is now clear that on Mua at least, bandicoots are common and were formerly hunted, as were echidnas. Questions remain, however, about the antiquity of the presence of bandicoots on the island.

Further survey work is required to ascertain the origin and status of echidnas and bandicoots on Mua and the bandicoots reported on nearby Badu. Knowledge of the mammals of these and other islands in Torres Strait will also be critical for the development of land management practices and species conservation in the region (Torres Strait NRM Reference Group 2005; 3D Environmental 2013).

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